Health Consultation

Chemetco

Hartford, Madison County, Illinois

USEPA Facility ID# ILD 048843809

Prepared by:

Illinois Department of Public Health
under cooperative agreement with the
Agency for Toxic Substances and Disease Registry

Purpose

The Illinois Environmental Protection Agency (Illinois EPA) referred the Chemetco site to the Illinois Department of Public Health (IDPH) to determine whether the site presents a public health hazard due to actual exposures to hazardous materials or potential exposure conditions. The site is being considered for inclusion in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) program, also known as Superfund, which is managed by the U.S. Environmental Protection Agency (USEPA).

Background and Statement of Issues

Chemetco, a former metal recycling smelter in Hartford, Illinois, developed the site in the late 1960s and started production in the early 1970s. The secondary smelting facility was capable of processing many types of metal-based wastes. Although the company promoted copper products, lead-based products were likely generated as well. The plant had a history of environmental violations, problems with properly managing the materials used, and with the byproducts created. The plant ceased operations in 2001. The company and some former employees were charged with environmental and criminal pollution violations.

The Chemetco site is in the American Bottom flood plain near the Mississippi River in Madison County, Illinois (Figure 1). The village of Hartford (population 1,545), approximately 1 mile north of the site (Bureau of the Census 2000), was the former mailing address of the site. The nearest residential area is Mitchell, a small community approximately ½ mile southeast. The site is above an aquifer that is a source of municipal, industrial, and agricultural water for several nearby communities including, Edwardsville, Hartford, Roxana, and Wood River.

Main site operations were conducted within a 41-acre area, but Chemetco also owns hundreds of acres of surrounding farm land. Over the 30 years of plant operations, some of this property was acquired to settle disputes with nearby farmers. The Mississippi River and two tributaries, the Cahokia Canal and Long Lake, are within 1 mile of the site.

Beginning in 1969, Chemetco built three 70-ton gas-fired furnaces (also called converters) which could accommodate a variety of raw materials, and later added a fourth converter. Production began in the early 1970s (E&E 1987). Two wells were installed to provide process water to the plant. Pumps were used to draw and divert water to various locations. Until 1985, hot water was placed in canals for cooling. When the pumps failed, the adjacent farm fields would flood.

Chemetco produced high-purity copper using an electrolytic acidic refining process. This electrolytic process used large amounts of strong acids that would at times reportedly release a visible "acid mist" drifting onto nearby farm fields. The process also required the management of large amounts of acidic waste capable of dissolving heavy metals. Other hazardous liquids used at the site included halogenated solvents that may have been used for cleaning machine parts.

Metal-based feedstock was received via rail, highway, or barge from hundreds of sources and locations. Materials accepted for secondary smelting at Chemetco included electronic equipment

and cables, slag, skims, turnings, grindings, and wastes from foundries, automobiles, buildings and factories. The incoming materials were unloaded, sorted, and eventually smelted and refined to remove unwanted materials and make new products.

These products included crude metal stocks and alloys, various grades of copper, lead-tin solder, zinc oxide, copper and nickel sulfates, and other inorganic compounds. At one time, zinc oxide was converted into zinc sulfate for distribution to the fertilizer industry. Reportedly, some materials were sold for the production of roofing shingles, thermal insulation, and sandblasting.

The material a water scrubber system collected as particulate in the exhaust gases of the rotary furnaces was referred to as zinc oxide residues. During operations, Chemetco generated crude zinc oxide from two sources: 1) the dry air pollution control equipment, such as baghouses, and 2) the wet scrubber system. Along with zinc, this residue also contains large amounts of lead, cadmium, and copper. The material coats nearly everything in the plant.

The waste streams included solid smelting wastes (slag). According to the company, these materials consisted of aluminum oxide, iron oxide, calcium oxide, and silicates (Chemetco 1987). Other wastes included bag house dust, refractory brick, spent cleaning solvents (including trichloroethylene), sulfuric and hydrochloric acids, and other electrolytic fluids. The facility also maintained a laboratory to assess the composition and quality of feedstocks and products. Chemicals wastes from laboratory testing also were generated.

In 1986 the company constructed bag-houses to collect dust. It was reported that the company used solid waste materials to fill pits, impoundments, and canals that were built on the site to hold process and wash waters. In some areas on the site, slag was spread up to a thickness of 11 feet, and used to construct facility parking areas and drives. A large parking lot that could accommodate semi-trailer trucks and other large types of equipment—sometimes called the "contractor's parking"—was constructed south of the main operations area.

The company also coordinated the use of solid materials as road material and parking lots elsewhere. A 1985 Illinois EPA memo referred to slag being used to develop the Lewis and Clark Park located between the river and the federal levee.

In 1989 the U.S. Army Corps of Engineers issued a Cease and Desist Order to the company to remove slag material from wetlands about 1 mile north of the Chemetco facility between the river and the river levee (Dept of the Army 1989).

Chemetco company literature and statements have often emphasized that the facility recycled most materials and that waste streams were not generated. But the end result of this recycling activity was piled feedstock residues, smelting and solid residues, and accumulated liquids. Much of the material was stored directly on the ground, with little attempt to provide barriers or work practices to limit exposures.

In the fall of 2001 the company closed the facility, filing for bankruptcy on November 13, 2001. On December 7, 2001, the Illinois EPA Director, due to environmental issues at the site, issued an order to seal the facility. The order restricts public access to certain portions of the site and

prohibits entry by anyone without prior permission (IEPA 2001). Currently, the court-appointed trustee is investigating whether any of the solid waste is marketable.

Sampling Activities

Liquid Wastes and Groundwater

Testing of the liquid wastes and groundwater found on the site by the company and by Illinois EPA revealed regular violations of metals and pH parameters in many monitoring well and surface water samples collected in the 1980s (ILPCB 1984). Metals were found at elevated levels; arsenic, chlorides, manganese, sulfates, and total dissolved solids were often measured at levels exceeding any acceptable water quality standards of the time.

Floor wash materials also were stored in impoundments near the building where copper was purified using electrolytic processes. The company filled these impoundments using solid materials from unknown sources in the early 1980s. Monitoring wells were installed in the underlying shallow aquifer around these areas. According to company statements, some of the highest levels of chemicals from the groundwater-monitoring network were found near the floor wash impoundment (Chemetco 1987).

In 1983, Madison County staff collected several samples on and around the site. Their report identified a ditch located south of Oldenburg Road with blue-green liquid that contained elevated levels of several metals (Table 1). County staff also collected treated effluent discharging into the Cahokia Canal that included cadmium (0.42-6.5 milligrams/liter [mg/l]), copper (0.15-1.88 mg/l), lead (0.4-2.1 mg/l), nickel (1.5-2.0 mg/l), and zinc (3-180 mg/l), all of which exceeded National Pollution Discharge Elimination System (NPDES) permitted limits.

According to a 1983 Illinois EPA memo, the strong-acid electrolytic bath was believed to have been releasing material. Through the years, during many of the sampling events liquids were measured with low pH values (acidic) or very high pH values (caustic). The high pH levels may have resulted from the company using caustic materials to attempt to neutralize standing acidic surface water. Acidic conditions typically increase the solubility of metals, and allow more mobility of the metal contaminants.

Monitoring wells were also installed near the filled south ditch (likely electrolytic solutions) and the north canals (around the large stacks in the northeast corner of the site). According to the company, monitoring wells were sampled in a scheduled manner. After an assessment of 1984 groundwater data, the company installed a subsurface interceptor drainage system (SIDS) on the south side of Oldenberg Road, down-gradient from the former floor wash impoundment. This system pumped some groundwater back to the plant.

Monitoring well samples collected in 1985 included boron (5.56 mg/l); chloride (8,740 mg/l); copper (2,272 mg/l); nickel (1,480 mg/l); and zinc (42.1 mg/l). These samples also had low pH values (2-3) and high dissolved solids (8,600-52,224 mg/l). The 1992 analyses of groundwater revealed persistent problems with concentrations of metals. In April 2001, monitoring well

samples from shallow and deep aquifers again exceeded groundwater standards for boron, cadmium, chloride, lead, and manganese (IEPA 2001).

Slag and Soil

Table 2 shows the metals detected in slag samples collected from the facility in May 1983 by Madison County investigators.

In 1998, USEPA and Illinois EPA conducted a study of the slag. USEPA sampled the area east of the slag pile that receives both water and fine slag materials during runoff events. Surface water and sediment samples indicated that runoff from the slag pile contains high lead levels and relatively high cadmium concentrations.

Because Chemetco had accepted material from a firm known to have dioxin contamination, USEPA investigated dioxin in 1987. On April 12, 1987, USEPA collected four waste samples and one slag sample for dioxin analysis (E&E 1987). Although the slag sample contained no dioxins, the four waste samples had detectable levels of all dioxin isomers which were analyzed. The zinc oxide residue sample from the polishing pits had a dioxin concentration of 3.4 parts per billion (ppb). In August 1999, Illinois EPA conducted follow-up sampling and found high levels of dioxin in the zinc oxide residue (IEPA 1999b).

Air Sampling

In 1992 USEPA announced that Chemetco was the nation's leading emitter of airborne lead (estimated emission of 78.11 tons). Air samples collected April 1991 to June 1992 repeatedly contained elevated lead levels. The highest 24-hour lead level was 43.93 micrograms per cubic meter. A lawsuit was filed for noncompliance with the Clean Air Act, the National Ambient Air Quality Standards (NAAQS) for lead, and state permits (USEPA 2000). A consent decree signed in 2000 required air monitoring, pollution controls, and the payment of a civil penalty. It does not appear that the company developed an air-monitoring plan or analyzed any off-site air samples. Along with lead, other metals were likely emitted and deposited onto surrounding areas.

Fish and Lake Sediments

Chemetco installed an illegal 10-inch pipe to discharge grey sludge wastes into wetlands located at the northern portion of Long Lake. This is thought to have been installed in the mid-1980s and used for about 10 years. The pipe was discovered by Illinois EPA staff in 1996. Sampling of the discharge area revealed elevated levels of cadmium and lead. The company was later fined $3.8 million, put on 5 years probation and ordered to initiate a clean up. Limited clean up occurred on the site property, but no downstream sediments in Long Lake were remediated.

In the summer of 1999, staff from the Illinois Department of Natural Resources and Illinois EPA collected fish samples from two sections of Long Lake. Buffalo and carp were collected closest to the site (the northern part of the lake where the illegal pipe discharged) were from the residential section of Long Lake. Buffalo and crappie were collected from the southern section

through Pontoon Beach. Fillet portions were analyzed for pesticides, polychlorinated biphenyls (PCBs), dioxins, and furans. No elevated levels of these chemicals were found.

April 2002 Samples

In April 2002, Illinois EPA staff collected soil, water, and sediment samples at the site and the surrounding wetlands (IEPA 2002). Fourteen on-site soil and slag samples (to a depth of 6 inches) were collected from areas inside the fence. Six residential soil samples (to a depth of 1 inch), 10 sediment samples from Long Lake wetlands, and four residential groundwater wells were also collected. These samples were analyzed for volatile organic chemicals (VOCs), semi-volatile organic chemicals, benzoic acid, phenol-based compounds, pesticides, polychlorinated biphenyls (PCBs), cyanide, sulfides, and metals. Ten private wells have been identified within one mile of the site. Samples collected in 2002 were primarily used to determine chemicals of interest, current health risks, and issues needing further consideration. These are discussed later.

Site Visit

IDPH staff reviewed digital photographs provided by Illinois EPA staff during an inspection of the site after the facility closed. Because the site has been sealed by the Illinois EPA director, routine site visits are limited and require special permission from Illinois EPA. Anyone entering the plant must have written permission from the Collinsville Office of Illinois EPA and comply with the conditions of entry. The site can be viewed easily from nearby roads and was most recently visited on August 6, 2003.

A striking feature of the facility is the tall, black waste piles between the facility and the surrounding acreage. These large piles are reportedly from the air-cooled secondary smelting process—they have been estimated to cover 13 acres. The remainder of the site includes former furnaces and stacks, concrete pads, buildings, parking areas, and driveways. In the past two deep process wells were drilled, but were not noted during the site visit. When the facility was operating, a surveillance system and 24-hour guards were employed. No security personnel were apparent during our visit.

The site is enclosed with a fence and the main parking lot has a sign stating that the facility is closed to the public. The main entrance leads to a large parking area that was built using metal-contaminated materials from the site. Roads, drives, and since the installation of gates, parking areas appear to be closed to public traffic. A railroad berm is located to the west of the site and a rail line is within 1 mile to the east. The western railroad berm next to Illinois Route 3 follows the Mississippi River levee. The levee and the wetlands are managed by the U.S. Army Corps of Engineers. Long Lake, located south of the site, is a tributary of the Mississippi River. During wet periods, the site is inundated with standing water. When the facility was operating, pumps were used to control on-site flooding.

Demographics

About 1,000 persons live within 1 mile of the site, primarily in a northern Granite City neighborhood, the southern part of Hartford, and some homes on the western edge of South

Roxana. Some individual farm homes around the site continue to be occupied. The nearest urban residential area is southeast of the site, about ¼ mile away. The major road to this neighborhood which parallels Long Lake, is known as Old Alton Road. Homes on this road have backyards relatively close to this wetland.

Discussion

Chemicals of Interest

To select chemicals for further evaluation, IDPH compared chemical levels in environmental media (soil, water, air) with available health-based values. ATSDR comparison values used are defined in Attachment 1. Because of differences in body size and development, comparison values are developed for both adults and for children. If an ATSDR comparison value has not been developed for a chemical, then other relevant values are discussed.

In on-site waste samples collected in 2002, antimony, arsenic, cadmium, copper, lead, nickel, and zinc were measured at levels exceeding soil comparison values for children (Table 3). Antimony, arsenic, cadmium, copper, and zinc also exceeded adult comparison values, with cadmium being the most frequent. Young children are not expected to be trespassing on the site.

In the eight sediment samples collected from Long Lake in 2002, arsenic and cadmium exceeded their respective comparison values (Table 4). Cadmium exceeded the child comparison value in seven (88%) of these samples. In residential soils, arsenic was the only metal found to exceed a comparison value (Table 5). For the groundwater samples collected from four private wells in 2002, no ATSDR health-based comparison values for drinking water were exceeded.

Exposure Analysis

An exposure pathway consists of (1) a source of contamination, (2) an environmental media and transport mechanisms, (3) a point of exposure, (4) an exposure route, and (5) a receptor population. When all these elements are identified, a complete exposure pathway exists. When one or more of these elements is missing, a potential exposure pathway exists; that is exposure to a contaminant may have occurred in the past, may be occurring now, or may occur in the future.

Most heavy metals are not readily absorbed through the skin and dermal contact is not a likely exposure route. Contaminated water, dusts, or sediments that cling to skin or hands could be accidentally ingested. This route is most likely for individuals who bite their fingernails, smoke cigarettes, or do not wash their hands before eating. Over the 30 years of Chemetco operations, inhalation was a primary route of exposure. Current exposures could occur when materials on the site become airborne. Small particles could be inhaled. Larger particles could be captured in the upper nasopharyngeal areas and be ingested.

Workers

In 1980, about 200 persons were employed at this site. When the plant closed in October 2001, about 150 workers were employed. It is not known how often personal protective equipment was

worn or how thorough were the housekeeping and hygiene practices. In the past, workplace air contamination was a problem until the a bag house was installed to help gather airborne dusts. Direct contact by handling and transporting materials was likely common. If hand washing, showering, and clothing changes did not occur, workers could have contaminated vehicles and personal items. No data on workplace air or worker bio-monitoring were available for this report.

The present work force is very small and no active production is occurring. Only approved visitors are allowed to go on the site since the facility has been under a seal order. On-site workers and visitors likely limit their exposures by using personal protective gear and procedures to reduce contamination of office buildings and vehicles.

Future remediation work should minimize the generation of metal-laden dust during clean up and limit the impact on adjoining properties. If personal protective equipment is not worn while working on the site, worker exposures could result in adverse health effects

Site Trespassers

Because the site is today relatively abandoned, trespassing could be a greater problem than previously. During operations the company employed around-the-clock security staff. With the increased use of personal recreational vehicles and the minimal security at the site, the waste piles could attract unauthorized visitors. Trails and other evidence of recreational vehicle use are present at the site. Because the waste piles contain high levels of contaminants, trespasser's exposure would be the most concentrated of any current scenario.

The Illinois EPA Director ordered the site sealed and individuals must gain permission from the Illinois EPA Director (IEPA 2001) to visit the site. The seal order includes the main operations areas, the southern parking lot and the sandy area south of the site. It does not include the agricultural fields to the east and north of the site. Trails and other evidence indicate continued trespass by users of recreational vehicles. These are most likely to be teenagers or young adults, and exposures are likely to be intermittent rather than long term. For trespassers, IDPH assumed a 50-kg child would visit the site 20 days per year, and ingest 100 mg of soil per day. Using this exposure scenario, cadmium and lead could cause adverse health effects. Both of these chemicals and their health effects are discussed further in the toxicological evaluation section.

Residents

Until air controls were installed and until the plant closure, past residents were likely exposed to dustborne heavy metals. The dust may have accumulated onto homes and properties. Because the Chemetco furnaces had large stacks, emissions could have traveled some distance before settling. In the past, farm residents may have lived closer to the facility. At times, impoundments overflowed, contaminating the adjoining properties. If residents or farm workers disturbed those areas, exposure via inhalation or ingestion may have occurred. These exposures are not as common today. It is suspected that fugitive emissions of air particulate or acid mist, runoff eroding from the slag piles or contaminated groundwater affected the nearby agricultural crops. Some metals may have entered the food chain or entered livestock feed.

Current residents near Chemetco could be exposed to fugitive dusts from uncovered solid wastes. Wastes released from the site could have contaminated sediments in wetlands south of the site. A residential area adjoins these wetlands to the southeast. In some yards, the water's edge forms the property line. Residents who wade, fish, boat or engage in other recreational activities in these wetlands could have increased exposures to these sediments, but these are not likely to result in adverse health effects. The exposure calculations are discussed in the next section.

In April 2002, six soil samples were collected from residential yards. The only chemical found at levels greater than comparison values was arsenic. IDPH assumed that a 10-kilogram (kg) child would be exposed to the highest levels found in residential soil while playing and would ingest 200 milligrams (mg) of soil daily, 10 months per year. Using this exposure scenario, no adverse health effects would be expected from exposure to arsenic in residential soil.

No lead was detected in residential soil samples. IDPH determined that lead could be an issue for adult on-site trespassers. This is discussed further in the toxicological evaluation section.

Most homes are presently connected to a public water supply, but could have used private wells in the past. The most recent sampling of private wells did not reveal any chemicals greater than their respective comparison values.

Long Lake Visitors

Long Lake south of the site received air and water emissions from Chemetco. This lake supports hunting, fishing, boating, and other recreational activities. Lower lake levels in summer expose more sediment. Metals can accumulate in soil from air deposition. Soil erosion and surface water runoff can move these metals to lake sediments, where they can remain in undisturbed locations for a long time. Inadvertent ingestion via hand-mouth activities or inhalation of air-borne contamination are considered the most likely exposure pathways.

Arsenic and cadmium were found at elevated levels in the sediments. IDPH assumed a 30-kg child would contact 100 mg of sediment, 2 days a week, 40 weeks per year. Using this exposure scenario, no adverse health effects would be expected to occur in children from exposure to contaminated sediments. Since the plant has closed, emissions from the facility have ceased and air exposures to workers, residents, and visitors have lessened.

Toxicological Evaluation

In most of the samples, on-site cadmium levels in soil exceeded comparison values, with the highest value estimated at 2,970 milligrams per kilogram (mg/kg). Cadmium can accumulate in the human body, primarily in the cortex of the kidney. It is thought that after a certain level is reached, the kidney becomes less able to function properly and molecules typically retained by the body are excreted. Over a lifetime, cadmium exposures should be avoided and minimized to avoid excessive body burdens of this toxic heavy metal (ATSDR 2003).

Lead is a well-known toxic metal that has no known essential role in the human body. To actively avoid exposures, it is important to be aware of potential sources of lead in our daily

lives. Most of the solid waste samples on the site contained elevated lead levels, with the highest concentration estimated to be 152,000 mg/kg or 15% lead. Exposure to lead at elevated levels can affect almost every organ and system in the body. The most sensitive is the central nervous system, particularly in children. Lead also damages kidneys and the reproductive system. In adults, there is a risk of an increase in blood pressure. The effects are the same whether lead is breathed or swallowed (ATSDR 2003).

Child Health Considerations

In communities faced with air, water, or food contamination, the many physical differences between children and adults demand special emphasis. Children can be at greater risk than adults from certain exposures to hazardous substances. Children play outdoors and sometimes engage in hand-to-mouth behaviors that increase their exposure potential. Children are shorter than are adults, and can breathe dust, soil, and vapors closer to the ground. A child's lower body weight and higher intake rate results in a greater dose of hazardous substance per unit of body weight. If exposure levels are high enough during critical growth stages, the developing body systems of children can sustain permanent damage. Finally, children are dependent on adults for access to housing, for access to medical care, and for risk identification. Thus, adults need as much information as possible to make informed decisions regarding their children's health.

Thus, children can be especially sensitive to some contaminants, and IDPH included children when evaluating exposures to site-related chemicals. Exposures of small children to the most common and widely used metals at this site should be fairly limited because the main facility is located in an area where young children would not attempt access. In that regard, IDPH assumed that young trespassers would be older children.

The metals of interest at this site have no known benefits to humans. Although the facility is no longer operating, these metals do not break down in the environment. The potential for adverse exposure remains in areas impacted by airborne and water-borne releases from the site, waste materials remaining on-site, and solid material transported offsite. Physical hazards are also associated with material remaining onsite, including unstable slag piles.

Conclusions

Using the available data and information reviewed, the Illinois Department of Public Health concludes that under current conditions this site poses **a public health hazard** because of the metals that have accumulated on the site and the evidence of trespasser user of the site. Years of processing and smelting recycled goods to collect copper, lead, and other metals have resulted in a large volume of accumulated on-site metals.

Those who may have been exposed to site-related chemicals in the past, present, or future are primarily site workers and trespassers. Recreational use of areas on the site by trespassers could result in exposure to elevated lead and cadmium levels.

Although the important aquifer under the site is known to contain high levels of metals, sampling area private wells in 2002 did not reveal any elevated chemical levels.

Recommendations

IDPH recommends that:

Illinois EPA continue to limit public access to the site to reduce the number of trespassers. Trespassing should be discouraged with gates and postings. The seal order currently in effect should limit the amount of trespassing on the site.

Current and future workers use personal protective equipment and practices to prevent contamination in offices, in vehicles, and in personal items. When remediation efforts begin, careful handling of on-site wastes should prevent undue exposures for workers and limit the amount of fugitive dust migrating around and off the site.

Public Health Action Plan

IDPH will review any additional information generated by, or collected now or in the future by other agencies. IDPH staff will participate in the review of remediation plans for this site.

Preparer of Report

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References

[ATSDR] Agency for Toxic Substances and Disease Registry. 2003. Toxicological profiles CD ROM. Atalnta: U.S. Department of Health and Human Services.

Belleville News-Democrat. 2000. Chemetco Lawsuits Filed.

Bureau of the Census. 2000 census population. Washington: Department of Commerce.

Chemetco. 1987. Site investigation plan - Chemetco, Incorporated, Hartford, Illinois. Tasks I, II, and IV. June 1987.

Department of the Army. 1989. St. Louis District, Corps of Engineers. May 11 Cease and Desist Order.

[E&E] Ecology and Environment, Inc. 1987. April 12 final report for Chemetco, Inc., prepared for US Environmental Protection Agency.

[IEPA] Illinois Environmental Protection Agency. 2002. CERCLA September 19 (released) expanded site inspection. Springfield: Office of Site Inspection, Bureau of Land.

[IEPA] Illinois Environmental Protection Agency. 2001. December 7 news release: Illinois EPA Director Issues Seal Order on Chemetco Property. Available at: http://www.epa.state.il.us/news-releases/2001/2001-146-chemetco-order.html. Last accessed 22 March 2004.

[IEPA] Illinois Environmental Protection Agency. 1999a. Final field sampling and analysis report, Long Lake, Mitchell, Illinois.

[IEPA] Illinois Environmental Protection Agency. 1999b. August 5 Bureau of Land memo re: Long Lake sampling with Illinois Department of Natural Resources.

[IEPA] Illinois Environmental Protection Agency. 1994. A Summary of Selected Background Conditions for Inorganics in Soil. Springfield: Office of Chemical Safety.

[IEPA] Illinois Environmental Protection Agency. 1986. January 23 potential hazardous waste site, preliminary assessment.

[IPCB] Illinois Pollution Control Board. 1984. Draft of Illinois Pollution Control Board. Madison County Stipulation and Proposal for Settlement with Chemetco (draft).

Madison County. 1983. December 5 Report of Madison County Building, Environmental & Zoning Department re: Chemetco Copper Reclamation Facility investigation.

[USEPA] US Environmental Protection Agency. 2000. EPA Region 5 Regional Counsel, Clean Air Act Enforcement Actions FY 2000. Available at: http://epa.gov/region5/orc/enfactions/enfactions2000/law-caa.htm. Last accessed 22 March 2004.

Certification

The Illinois Department of Public Health prepared this Chemetco health consultation under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It was done in accordance with approved methodology and procedures existing at the time the health consultation was begun.

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ATSDR

The Division of Health Assessment and Consultation, ATSDR, has reviewed this health consultation and concurs with its findings.

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Table 1. Results for liquid samples collected in ditch south of Oldenburg Road, May 1983.

Metal	Concentration Range (milligrams per liter)
Arsenic	0.06-5.2
Cadmium	2-6.2
Chromium	0.6-4.5
Copper	76-7,900
Iron	440-6,300
Lead	0.5-4.4
Nickel	53-5,400
Sulfate	2,455-47,100
Zinc	51-440

Table 2. Maximum level of metals detected in slag samples, May 1983.

Metal	Concentration (milligrams per kilogram)
Arsenic	600
Barium	525
Cadmium	8
Chromium	107.5
Copper	13,750
Iron	265,000
Lead	21,563
Manganese	5,062
Mercury	0.03
Nickel	1,550
Zinc	53,750

Table 3. Chemicals of Interest for Chemetco Site. On-site Metal Concentrations in Solid Wastes in milligrams per kilogram (mg/kg). Illinois EPA samples collected 2002.

	Range of Concentrations (mg/kg)	Number of samples exceeding comparison value	Soil Comparison Values		
			Type	Value (mg/kg)	Source
Antimony	1.6J-1,450J	2/13 (7 R)	Child	20	RMEG
		2/13 (7 R)	Adult	300	RMEG
Arsenic	ND-242J	13/13	All ages	0.5	CREG
		3/13	Child	20	RMEG
		1/13	Adult	200	RMEG
Cadmium	3.8J-2,970J	10/13	Child	10	RMEG
		5/13	Adult	100	RMEG
Copper	1,750-192,000J	8/13	Child	2,000	IEMEG
		4/13	Adult	20,000	IEMEG
Iron	12,600-273,000		None	15,000	IL Mean
Lead	454J-29,400J	10/13	Child	1,000	IL LPPC*
Mercury	ND-26.6		None	0.1	IL Mean
Nickel	298-5,820J	2/13	Child	1,000	RMEG
Zinc	642-217,000J	10/13	Child	20,000	IEMEG
		1/13	Adult	200,000	IEMEG

J = laboratory estimated values
R = laboratory rejected values

IL LPPC = Illinois Lead Poisoning Prevention Code; 1000 ppm is for yard average, 400 ppm for bare soil/high contact areas.

IL Mean = typical concentration in IL soils (IEPA, 1994)
RMEG = Reference Dose Media Evaluation Guide
CREG = Cancer Risk Evaluation Guide
IEMEG = Intermediate Environmental Media Evaluation Guide

Table 4. Chemicals of Interest in Long Lake Sediment South of Chemetco Site in milligrams per kilogram (mg/kg). Illinois EPA samples collected 2002.

	Range of Sediment Concentrations (mg/kg)	Number of samples exceeding comparison value	Comparison Values		
			Type	Value (mg/kg)	Source
Arsenic	4.8-7.8	8/8	All ages	0.5	CREG
Cadmium	8.1-57.3	7/8	Child	10	CEMEG

CREG = Cancer Risk Evaluation Guide
CEMEG = Chronic Environmental Media Evaluation Guide

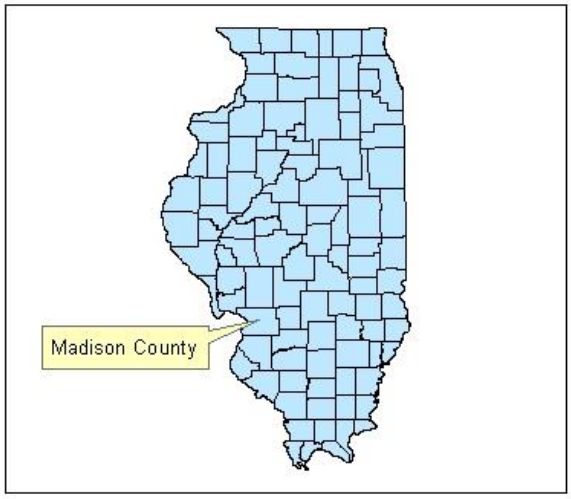
Table 5. Chemicals of Interest in Residential Soil Near the Chemetco Site in milligrams per kilogram. Illinois EPA samples collected 2002.

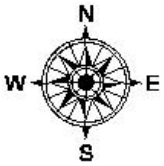
	Range of Concentrations	Number of samples exceeding comparison value	Comparison Values		
			Type	Value	Source
Arsenic	6.1-13.1	6/6	All ages	0.5	CREG

CREG = Cancer Risk Evaluation Guide

Figure 1

Approximate Location of Chemetco





Source: IDPH GIS

ATTACHMENT 1

Comparison Values Used In Screening Contaminants For Further Evaluation

Environmental Media Evaluation Guides (EMEGs) are developed for chemicals based on their toxicity, frequency of occurrence at National Priorities List (NPL) sites, and potential for human exposure. They are not action levels but are comparison values. They are developed without consideration for carcinogenic effects, chemical interactions, multiple route exposure, or exposure through other environmental media. They are very conservative concentration values designed to protect sensitive members of the population.

Reference Dose Media Evaluation Guides (RMEGs) are another type of comparison value. They are developed without consideration for carcinogenic effects, chemical interactions, multiple route exposure, or exposure through other environmental media. They are very conservative concentration values designed to protect sensitive members of the population.

Cancer Risk Evaluation Guides (CREGs) are estimated contaminant concentrations based on a probability of one excess cancer in a million persons exposed to a chemical over a lifetime.